Pulmonary sarcomatoid carcinoma presenting as a necrotizing cavitary lung lesion: diagnostic dilemma

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Pulmonary sarcomatoid carcinoma (PSC) is a rare histological subtype that has an aggressive course with average survival of 11-13 months.[1] In clinical practice, the possible presentations of this rare cancer are not widely known, resulting in a misdiagnosis. That is what happened with our patient, who presented with necrotizing cavitary lung lesion and soft tissue necrotizing lymphadenitis. The clinical picture was reminiscent of tuberculosis or granulomatosis with polyangiitis and was further confounded by negative computed-tomography (CT)-guided biopsy and bronchoscopy findings, which added to the delay in diagnosis. With the currently available knowledge, the diagnosis of PSC depends largely on evaluation of the surgically resected specimen, which in most cases is avoided until there is a high suspicion of PSC. Biopsy is not useful due to extensive necrosis, as will be seen in our case. Consequently, most of the data in the literature is based on case series of autopsy specimen, and the clinical characteristics of PSC remain unclear. The rarity of PSC has prevented its characterization in literature. We report here a rare presentation of PSC with necrotizing lung lesion, to add to the paucity of the current data.

Case presentation and summary

A 58-year-old homeless man presented to the Upstate University Hospital, Syracuse, New York, with a 25-pound weight loss during the previous month and associated productive cough and hemoptysis for a week and a painful mass in the nape of his neck. He denied any fever, chest pain, sick contacts, or joint pain. He had a history of about 40 pack-years of smoking, and his brother had recently been diagnosed with lung cancer. A tender fluctuant mass was detected in the nape of his neck on examination (Figure 1).

The patient had presented 9 months earlier with persistent cough and hemoptysis, and at that visit was found to have a cavitary lesion in the right lung measuring 2 cm (0.8 in). He had undergone a computed-tomograpghy (CT)-guided biopsy of the lesion, which had shown acute and chronic inflammation with fibrosis, and he had negative bronchoscopy findings. The patient tested negative for tuberculosis during the first visit but he left the hospital against the medical advice of the physicians and he was lost to follow-up until his re-presentation.

On physical examination at his re-presentation, the patient seemed cachectic, with a blood pressure of 94/62 mm of Hg. The mass in the nape of his neck was about 3 cm (1.2 in) long, with erythema of the surrounding skin (Figure 1). Bronchial breath sounds were heard in the right upper lobe of the lung, likely due to the underlying cavitary lesion (Figure 2B).

Relevant lab findings included a negative HIV test and repeat AFB (acid-fast bacilli) sputum cultures. A CT-guided biopsy with contrast of the thorax showed an interval increase in the size of the cavitary lesion in the patient's right upper lobe, now measuring about 10 cm (4 in). Also seen were multiple nodules elsewhere in both lungs, with the largest measuring 8 mm (0.3 in). A CT scan of the neck showed 3 cm cystic mass within the posterior subcutaneous soft tissue of the C3 level, confirming the examination finding of the neck mass (Figure 2A) with peripheral enhancement and surrounding infiltrative changes, likely abscess or malignant lymph node versus necrotic infection. He underwent bronchoscopy, which again failed to reveal any endobronchial lesions. Bronchoalveolar lavage was sent for microbiological analysis, including AFB and fungus, but came back negative. Transbronchial biopsy cytology revealed fragments of tumor composed of large pleomorphic cells without glandular or squamous differentiation, within large areas of necrosis (Figure 3).

Accepted for publication January 12, 2016. Correspondence: Gaurang Nandkishor Vaidya, MD; gaurang2489@gmail.com. Disclosures: The authors report no disclosures or conflicts of interest. JCSO 2017;15(2):103-105. ©2017 Frontline Medical Communications. doi: https://doi.org/10.12788/jcso.0259.

Immunohistochemical studies showed strong reactivity with cytokeratin CAM5.2 (Figure 4), weak and focal reactivity with cytokeratin AE1/AE3 (Figure 5), and lack of reactivity with CD20, CD3, CD30, S-100, MART-1, TTF-1 and p63, all findings consistent with sarcomatoid carcinoma.

The patient underwent fine-needle aspiration and drainage of the neck lesion and the culture grew mixed organisms. The results of a bone scan, which was done within a week, showed multiple foci of uptake in the ribs and cervical spine.

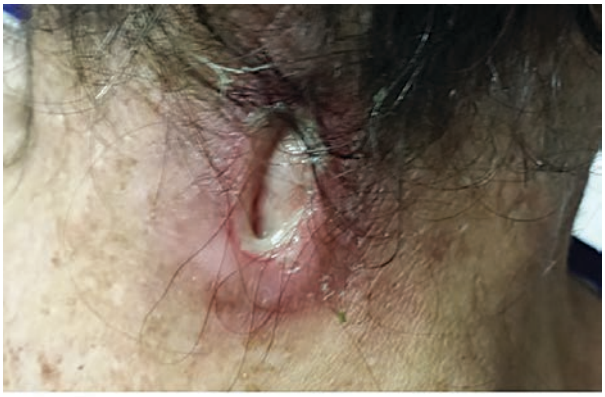

FIGURE 1 Fluctuant mass, about 3 cm long, in the nape of the neck, after drainage, showing erythema of the surrounding skin.

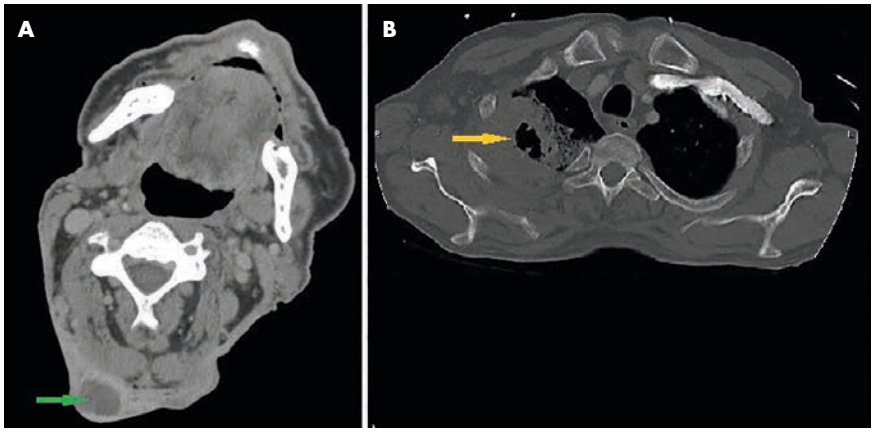

FIGURE 2 **A,** A computed-tomography scan of the neck, showing a cystic lesion in the posterior soft tissue (green arrow). **B,** A large necrotic cavitary region in the right upper lobe of the lung (yellow arrow)

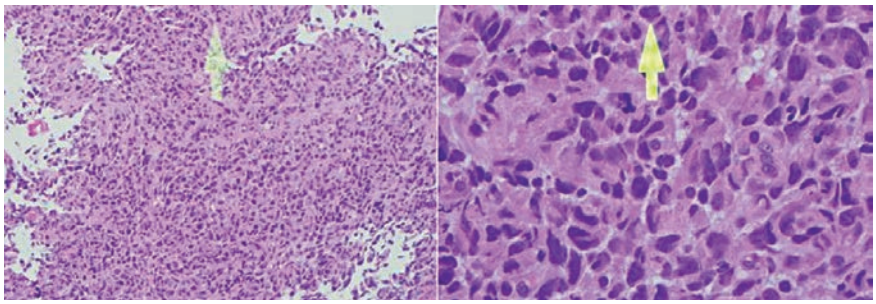

FIGURE 3 Images from the bronchoscopic biopsy, showing alveoli replaced by pleomorphic and spindle cells. Hematoxylin and eosin stain, x50 (left) and x200 (right). Arrows are artifacts from the microscope

Given the patient's advanced disease, he was started on palliative radiotherapy with radiosensitizing chemotherapy with carboplatin (target AUC 6) and paclitaxel (135 mg/m^2 over 24 hours). His symptoms of hemoptysis improved transiently after the first cycle, but he became hypotensive and drowsy during the second cycle of therapy, and the family decided to make the patient comfort care and withdraw all further treatment. He was discharged to hospice.

Discussion

PSC is a rare variant of non-small-cell carcinoma lung cancer, accounting for up to 0.4% of lung malignancy.[1] It was recently subtyped by the World Health Organization as a non-small cell lung carcinoma with certain amount of differentiation resembling sarcoma or containing elements of sarcoma.[2-4] It is not known why both elements co-exist in the tumor, but Franks and colleagues some theories have been postulated in the literature, including possible origin from a single, aberrant stem cell with progenies differentiating in two separate pathways.[3]

Sarcomatoid carcinoma consists of spectrum of tumors including pleomorphic carcinoma, spindle cell carcinoma, giant cell carcinoma, carcinosarcoma, and blastoma.[3,4] It usually shows male preponderance, and association with smoking.[3] The diagnosis commonly occurs in the sixth decade of life, except for pulmonary blastoma, which is more common in the fourth decade and with equal gender distribution.[4]

The presenting symptoms can be variable and nonspecific, but predominantly include chest pain, cough, hemoptysis, and/or weight loss.[5] Radiologically, pulmonary sarcomatoid cancer presenting as a necrotizing cavitary lesion in the lung is a rare finding, seldom reported in the past.[6,7] The presentation in our case, with necrotizing lymphadenitis, was reminiscent of an infectious or autoimmune etiology such as tuberculosis or granulomatosis with polyangiitis. The presence of extensive necrosis in the lesion and the characteristic heterogeneity of the tumor had resulted in inconclusive biopsy findings during the previous presentation. In clinical practice, there is over-reliance on biopsy findings to make the distinction between cancer and other mimicking conditions. This is especially true for rare tumors such as PSC, which often results in misdiagnosis and a delay in administering the

proper treatment.

Transbronchial biopsy in cases such as the present case, carries little benefit because the diagnosis depends on the site from which the biopsy is taken and whether the biopsied tissue is representative of the entire mass. The diagnosis can be suspected based on the clinical and radiological findings but confirmation requires a surgical resection to delineate the accurate cytology and architecture.[5,6,8] Huang and colleagues showed a misdiagnosis rate of PSC of >70% preoperatively.[4] Resective surgery is feasible only in patients with high index of suspicion for a malignancy, which in most cases requires previous confirmation with a biopsy. The rarity of this cancer, its unusual presentations, and the lack of specific testing preclude early diagnosis and timely treatment of this fatal condition.

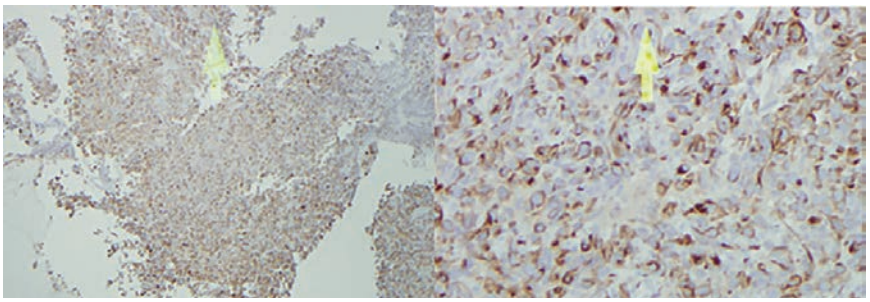

FIGURE 4 Biopsy tissue showing positivity to CAM 5.2. Hematoxylin and eosin stain, x200

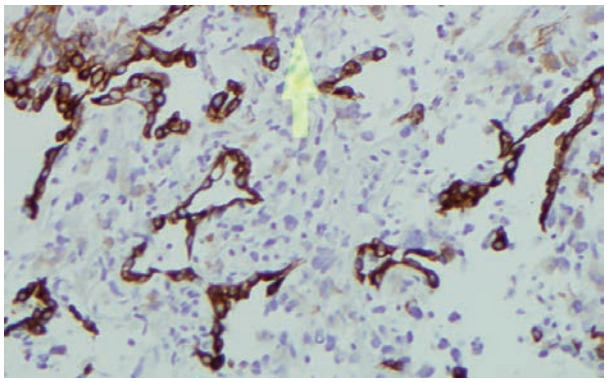

FIGURE 5 Biopsy sample showing focal reactivity to AE1/AE3. Hematoxylin and eosin stain, x200

Initial treatment options for localized or with limited spread disease is resective surgery. The role of chemo- or radiation therapy is not known, but they have not previously shown promising results,[6,8] except in some cases when they are used as postoperative adjuvant chemotherapy[4] or in bulky, locally invasive tumors.[1] The recurrence rate after surgery is very high, resulting in a poor 5-year survival rate.[1,8] Experimental therapies, such as antibodies that target epidermal growth factor receptor mutations, have not shown much success either.[8] In conclusion, the outlook for patients with PSC with the current available knowledge and treatment protocols, is dismal.

Most of the current knowledge and data in the literature is based on cases from autopsy or early-stage surgical resections rather than on patients with advanced cancer.[5] Moreover, the role of surgical resection in PSC is questionable, given the high recurrence rate. Subsequently, the clinical and pathological manifestations have yet to be well characterized.[4] There has been advance with the publication of more studies recently. Cytokeratin markers such as CAM 5.2 and AE1/AE3 are commonly useful to support the diagnosis when suspected.[3] Other markers, including the carcinoembryonic antigen, CD15, and thyroid transcription factor-1 may be variably positive, based on the differentiation of the cancer. Other exciting prospects in the study of PSC include the suggestion of a modified vimentin histologic score for better characterization of the cancer and the discovery of high platelet-derived growth factor receptor beta immunohistochemistry expression in PSC as a potential target for future therapy.

Conclusion

Pulmonary sarcomatoid lung cancer can present with a predominant necrotizing picture that mimics diseases such as tuberculosis. In such case, transbronchial biopsy carries little benefit because the diagnosis depends on whether the biopsied tissue is representative of the entire mass, often confounded by the extensive necrosis. More data is needed to determine prognostic factors and appropriate therapeutic strategies.

References

1. Martin LW, Correa AM, Ordonez NG, et al. Sarcomatoid carcinoma of the lung: a predictor of poor prognosis. Ann Thorac Surg. 2007;84(3):973-980.
2. Brambilla E, Travis WD, Colby TV, Corrin B, Shimosato Y. The new World Health Organization classification of lung tumours. Eur Respir J. 2001;18(6):1059-1068.
3. Franks TJ, Galvin JR. Sarcomatoid carcinoma of the lung: histologic criteria and common lesions in the differential diagnosis. Arch Pathol Lab Med. 2010;134(1):49-54.
4. Huang SY, Shen SJ, Li XY. Pulmonary sarcomatoid carcinoma: a clinicopathologic study and prognostic analysis of 51 cases. http://wjso.biomedcentral.com/articles/10.1186/1477-7819-11-252. Published 2013. Accessed March 12, 2017.
5. Travis WD. Sarcomatoid neoplasms of the lung and pleura. Arch Pathol Lab Med. 2010;134(11):1645-1658.
6. Pelosi G, Sonzogni A, De Pas T, et al. Review article: pulmonary sarcomatoid carcinomas: a practical overview. Int J Surg Pathol. 2010;18(2):103-120.
7. Chang YL, Lee YC, Shih JY, Wu CT. Pulmonary pleomorphic (spindle) cell carcinoma: peculiar clinicopathologic manifestations different from ordinary non-small cell carcinoma. Lung Cancer. 2001;34(1):91-97.
8. Park JS, Lee Y, Han J, et al. Clinicopathologic outcomes of curative resection for sarcomatoid carcinoma of the lung. Oncology. 2011;81(3-4):206-213.